

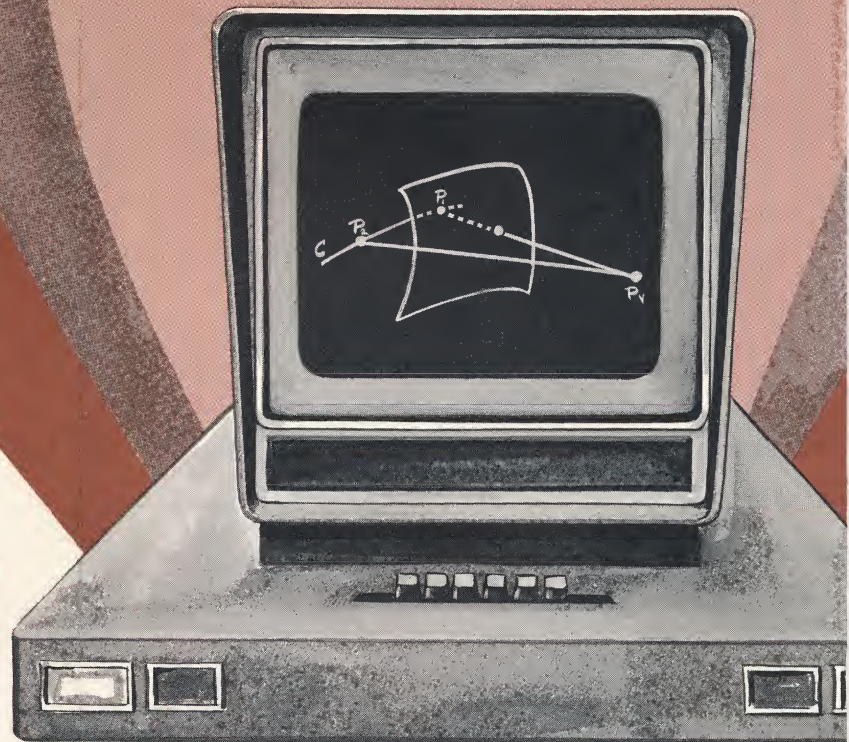
A THREE-DAY SEMINAR software for interactive computer graphics

New York, N.Y., June 15-17, 1970

cybex

ASSOCIATES, INC.

50 Shelley Lane
Great Neck, N.Y. 11023



presented
by

cybex

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Great Neck, N.Y. 11023

Three-Day Seminar

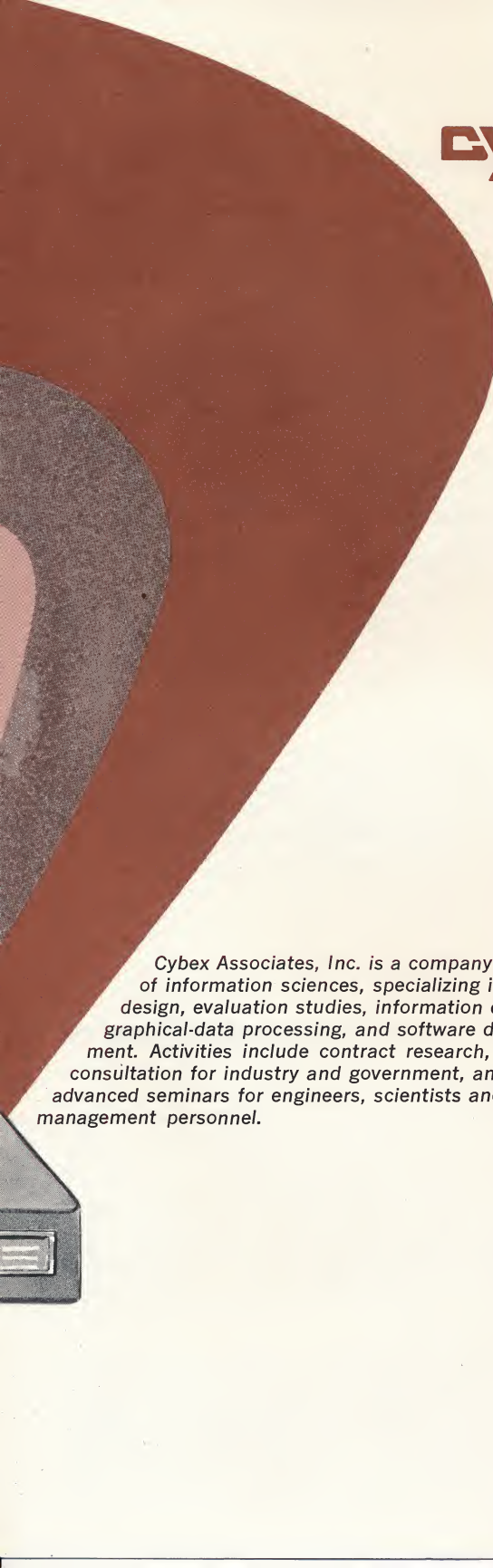
software for interactive
computer graphics

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MR THEODORE H NELSON
T NELSON SYS-CONSULTANT
P O BOX 1546
POUGHKEEPSIE N Y 12603



FIRST CLASS



cybex
ASSOCIATES, INC.
presents

software for interactive computer graphics

A THREE-DAY SEMINAR

Software for Interactive Computer Graphics is a three-day seminar for computer scientists, programmers and technical managers concerned with the development of software systems for the highly interactive use of computer displays.

The seminar will be presented by four leading experts from the field of computer graphics. The lecturers will provide a detailed presentation of the techniques used to create interactive computer graphics programs. The seminar will emphasize the functions to be provided by a graphics-oriented operating system and the design of a data structure (picture model) and its subsequent manipulation both for display purposes and as input to an applications program. Advanced hardware concepts as well as mathematical manipulations on two- and three-dimensional objects will also be discussed.

The seminar will include a case study of a program operating on a large time-shared computer system and using an interactive display. Extensive notes on the case study, including a program functional description, flow diagrams and annotated source listings will be provided; the operation of the program will be illustrated by a movie specifically prepared for this seminar. The techniques presented through the case study include the correlation of graphic input with objects in the data structure, the use of "light buttons" for controlling program flow, and the definition and manipulation of a hierarchy of picture parts. The program will provide a basis for discussing alternative data structures. The seminar should provide each participant much of the "hands-on" experience of having written a highly interactive graphics program.

An extensive set of printed lecture notes will be distributed to all registrants at the seminar.

Cybex Associates, Inc. is a company in the field of information sciences, specializing in system design, evaluation studies, information display, graphical-data processing, and software development. Activities include contract research, consultation for industry and government, and advanced seminars for engineers, scientists and management personnel.



program outline

MONDAY, June 15, 1970

- 8:30 a.m. **Registration**
- 9:00 a.m. **Review of Current Hardware**
Description of currently available display processors and graphic input devices, with emphasis on similarities, differences, and special features.
- 10:00 a.m. **Coffee Break**
- 10:15 a.m. **Software and Data Structure Review**
Software functions such as image generation, storage management, attention handling, and symbolically identifying objects. Data structure terminology and operations. List and pointer structures.
- 11:15 a.m. **Introduction to the Case Study**
Program functions, picture modelling, and data-structure design. Showing of movie illustrating program operation.
- 12:00 noon **Luncheon Break**
- 1:30 p.m. **Program Operations on the Data Structure**
Drawing and deletion of picture elements and network nodes, defining pictures in terms of more basic elements.
- 3:00 p.m. **Discussion and Coffee Break**
- 3:30 p.m. **Data Structure Techniques Using Secondary Storage**
Handling of data structures that exceed core memory capacity. Hardware and software paging systems, associative and set-theoretic techniques.

TUITION

Tuition for the three-day seminar, including the complete set of printed lecture notes is \$350 for the first registrant and \$315 for each additional registrant from the same organization. Checks for tuition should be made payable to CYBEX Associates, Inc., 50 Shelley Lane, Great Neck, N.Y. 11023. Reservations will be accepted in the order received. Early registration is advised since registration is limited. Registrations may be cancelled up to seven days before the start of the seminar. Substitution of another person for registrant may be made at any time.

The seminar will be conducted at the McAlpin Hotel, 34th Street and Broadway, New York, N.Y. 10001. Lectures will start each morning at 9:00 a.m. and end by 5:00 p.m.

ACCOMMODATIONS

For hotel accommodations registrants should make their own reservations at the McAlpin Hotel (a block of rooms has been reserved there and will be held until two weeks prior to the date of the course). If preferred, registrants may make their reservations at any of the other numerous hotels in mid-town New York.

TUESDAY, June 16, 1970

- 9:00 a.m. **Graphic Input and Output for the Case Study**
Generating of the screen display from the data structure, definition and call of sub-pictures, interpretation of graphical input, and identifying objects.
- 10:15 a.m. **Coffee Break**
- 10:30 a.m. **Review and Critique of Case Study**
Removal of restrictions in the sample program. Alternative techniques for processing graphic input and for representing problem data structure.
- 12:00 noon **Luncheon Break**
- 1:30 p.m. **Applications of Low-Cost Interactive Graphics Terminals**
Economical line-drawing display with graphic input devices. Discussion of currently available low-cost interactive graphics terminals. Examples from actual in-use applications.
- 3:00 p.m. **Discussion and Coffee Break**
- 3:30 p.m. **Hardware Configurations and Tradeoffs for Remote Computer Graphics**
Review of various hardware configurations, including computer-buffered displays, storage CRT terminals, and video-based systems.

LECTURERS

JOHN W. BRACKETT, Ph.D.

Director of Graphic Systems, SofTech, Inc., and formerly Research Associate, Project MAC, Massachusetts Institute of Technology. Research in the design and implementation of interactive computer systems and in computer graphics. Senior Visiting Fellow, Computer-Aided Design Project, University of Edinburgh (1966-67); Visiting Scientist, INDRA computer graphics project, Institute of Computer Science, University of London (1968); Lecturer NATO Summer School Course on Man-Machine Interaction (1966).

ANDRIES VAN DAM, Ph.D.

Manager, Computer Software Systems Research Center, Providence, R.I. Associate Professor of Computer Science, Brown University. Consultant to ACM's Curriculum Committee on Computer Science; lecturer for ACM Special Interest Committee on Computer Graphics; guest lecturer in computer graphics at University of Michigan's computer and program organization course, and the NATO Summer School Course on New Trends in Computer Programming; co-author of five chapters in *The Man-Made World*, McGraw-Hill, 1968; author

WEDNESDAY, June 17, 1970

- 9:00 a.m. **Analysis of Interactive Graphics Systems in Production Use**
Description of systems for structural analysis and 3-D pressure data reduction. Discussion of results based on actual operating experiences.
- 10:15 a.m. **Coffee Break**
- 10:30 a.m. **Mathematical Techniques in Computer Graphics**
Coordinate Geometry, homogeneous coordinates, picture transformations such as translation, rotation, scaling, and windowing and the perspective transformation. Discussions of hardware implementations of picture transformations.
- 12:00 noon **Luncheon Break**
- 1:30 p.m. **Measurement of Effectiveness and Productivity of Computer Graphics**
In what ways does interactive computer graphics pay for itself?
- 3:00 p.m. **Discussion and Coffee Break**
- 3:30 p.m. **Recent Research in Computer Graphics**
Summary of recent work on the "hidden-line" problem, color display systems, half-tone image generation. Implications for the future.

of numerous technical papers on programming systems, data structures and computer graphics; and author of a book on computer graphics (in preparation).

S. H. CHASEN, M.S.

Senior Staff Scientist, Lockheed-Georgia. Development of interactive computer graphics systems, with special application to the aircraft industry. Member, National Computer Systems Committee of American Institute of Aeronautics and Astronautics.

ROBERT H. STOTZ, M.S.

President, Computer Displays, Inc.; formerly with M.I.T. Electronic Systems Laboratory, developed first low-cost storage tube display system; active in development of remote graphics terminals and time-sharing systems.

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software for interactive computer graphics

New York, N.Y., June 15-17, 1970

detach and mail

Name _____

Title _____

Organization _____

Street _____

City _____ State _____ Zip _____

Telephone () _____ Ext. _____
Area Code

Additional Registrants

Name _____

Title _____

Name _____

Title _____

Tuition: \$350 for first registrant and \$315 for each additional registrant from same organization.

Mail registration application
with tuition check or purchase order to
CYBEX Associates, Inc.
50 Shelley Lane, Great Neck, N.Y. 11023